

Association Between Interleukin-1 Genotype and Periodontal Disease in a Diabetic Population

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Background: Recently, it has become evident that for many common chronic diseases, modifying factors amplify disease mechanisms to make the clinical condition more severe. The aims of this report were 1) to investigate the prevalence of periodontitis in a diabetic population, 2) to evaluate the association of periodontitis with metabolic control, and 3) to evaluate periodontitis in diabetics with different interleukin (IL)-1 genotypes.

Methods: One hundred diabetic patients were screened. Type and duration of diabetes, level of control (glycosylated hemoglobin), and demographic data were recorded. Periodontal disease was defined as two or more teeth with clinical attachment loss (CAL) ≥ 5 mm. Poorly controlled diabetes was defined as glycosylated hemoglobin values $> 8\%$. Finger-stick blood samples were collected and analyzed for genotyping of IL-1A (+4845), IL-1B (+3954), IL-1B (-511), and IL-1RN (+2018) polymorphisms.

Results: Among the diabetic patients in the study, 66% showed periodontal destruction, and 43% of those could be characterized as severe. The prevalence of severe attachment loss increased with decreasing control of diabetes. Only the IL-1B (-511) genotype was found to be associated with periodontal disease in the African American patients ($P < 0.05$). The frequency of allele 1 was 0.77 in periodontitis affected versus 0.33 in healthy African American diabetics. A borderline significant association between IL-1B (+3954) and periodontal disease also was noted in Caribbean periodontal patients ($P = 0.06$); however, the allele 2 frequency in this population was only 10%.

Conclusions: These data confirm the high prevalence and severity of periodontitis in the diabetic population, and support the association between poor glycemic control and periodontal disease. The low prevalence of some of the IL-1 gene polymorphisms in the ethnic groups included in this study limits the validity of conclusions on genotype associations with clinical findings, but there was a trend suggesting that allele 1 at IL-1B (-511) and IL-1B (+3954) was overrepresented among diabetics with periodontal disease. *J Periodontol* 2003;74:1183-1190.

KEY WORDS

Alleles; diabetes mellitus/complications; genotype; interleukin-1; metabolic control; periodontal diseases/complications; polymorphism.

Diabetes mellitus (DM) encompasses a heterogeneous group of disorders with the common characteristic of altered glucose tolerance or impaired lipid and carbohydrate metabolism. DM affects approximately 17 million people in the United States and is increasing at an annual rate of 6%.¹ This increase is probably due to an increased awareness by the public in response to awareness campaigns, an increase in the elderly population, and an increase in the accuracy of diagnosis. The disease is clearly a public health problem.

The relationship between diabetes mellitus and periodontal health status was determined in Pima Indians of the Gila River Indian community in Arizona by Emrich et al.² This tribe of Native Americans has the world's highest reported incidence and prevalence of non-insulin-dependent diabetes mellitus. Subjects with type 2 diabetes had an increased risk of destructive periodontitis when attachment loss was used to measure the disease. These findings demonstrated that diabetes increases the risk of developing destructive periodontal disease about three-fold.²

It also has been suggested that the variation in severity of periodontitis among diabetics is related to metabolic control. Some studies have reported an association between poor glycemic control and increased occurrence of periodontitis,³⁻⁶ although a number also have reported no association.^{7,8} The extensive variations in the design, conduct, and analysis of this set of studies contribute to inconsistencies

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